Journal of Energy Technologies and Policy
ISSN 2224-3232 (Paper) ISSN 2225-0573 (Online)
Vol.7, No.2, 2017
www.iiste.org

The Core Electricity Issues of Pakistan

Kiran Azeem
Assistant professor Department of commerce, Jinnah University for Women

Group Members
Alia Shareef
Student of M.Com

Ayesha Bakhtawar
Student of M.Com

SamraArif
Student of M.Com

Abstract
Electricity is the pillar for the economy of a country. Pakistan is undergoing a phase of serious electricity shortage which is heavily affecting its agriculture and industrial sectors. During the probe, we found out the factors causing the shortfall. A like source of primary data is collected randomly from firms of the industries, bankers, consumers, suppliers and distributors.This study intended to ascertain determinants for electricity shortage in Pakistan and to examine the variation in the dependent variable (shortage of electricity) by four independent variables of line losses, infrastructure, financial funding, and hydroelectric resources. Research objective are to find out how these independent variables affect on production of electricity. Result showed the positive relationship between hydroelectric dams and dependent variable. Development of dams will prove to be a helping hand in energy supply.
Keywords: Line losses, financial funding, hydroelectric, shortage of electricity.

OBJECTIVES

The main objectives of our research are
1. To find out how shortage of hydroelectric projects hinders the production of electricity.
2. To analyze how scarcity of power plants causing electricity shortage.
3. To identify effects of line losses on electricity supply system of Pakistan.

INTRODUCTION

Pakistan among countries that are facing the most crucial and severe electricity shortage. Karachi which was once known as the "CITY OF LIGHTS" is now known for it's darkness. Shortage of electricity is severely impeding the country's economy. Crisis started by the end of 2006 when the power distribution companies were unable to meet the demand of the population. By that time the shortage was only 15%, by the end 2009 Pakistan started going through the phase of load shedding. Approximately the demand is around 22000 MW but unfortunately only 17000 MW is being provided by the power distributing companies making the shortfall of 4000-5000 MW, more or less 23% of the requirement. In most of the urban areas of Pakistan daily 7-8 hours of load shedding has been recorded while on the other hand rural areas are facing worse situation which is almost 12-14 hours. Their daily lives have been vanquish because of this issue.

The major problems due to which the supply of electricity is shortened are poor infrastructure, financial funding, hydroelectric plants, corruption, distribution system, energy cost, demand, wastage of energy, high cost of fuel, coal, Government, circular debt, under recovery of bills, over consumption, over population, luxuries, severe weather, low voltage, dam reservoirs shortage, thermal power generation, line losses, theft of electricity, lack of electricity, illegal connection, inefficient appliances, lack of knowledge, monopoly, renewable energy and rental plants.

In this research we discuss four crucial variables that are contributing in shortfall of electricity.

Politically government is trying to convince the people of the country at large that it is seriously striving to put the jinn of electricity shortage into the bottle but practically no considerable improvement is faced in the situation. However the political pundits are pointing that the government may take the people by surprise in the election year by overcoming and shortening the gap of demand and supply of electricity there by developing a mechanism which can produce considerable amount of electricity into the system.

LITERATURE REVIEW

With the lapse of time Pakistan started to face the electricity shortage but the situation became disastrous in 2010.

Pakistan has to make strong efforts to cover up its deficiency of 4000 to 5000 MW. 17000 MW is being produced by the power producing companies. 31% from the hydroelectric resources contributes in the production of electricity while 4% from the nuclear energy, 37% oil, 28% gas and 0.04% coal.

Pakistan's energy infrastructure is inappropriate and inadequate. Pakistan is undergoing stern downfall and no serious efforts have been made to improve the infrastructure despite. Quick demand growth, transmission losses, power theft and seasonal reduction have complicated the situation. As a result, the supply is not meeting the demand.

The basic reason for the short fall of electricity is the inappropriate policies of government and improper funding to the electricity regulatory authorities. Independent Power producers (IPP's) donate appreciably in electricity generation in Pakistan but unfortunately, IPPs are unable to produce according to the demand of Pakistan.

Hydroelectric resources may contribute in generation of electricity but unfortunately Pakistan is having only two dams Mangla and Turbela, which are insufficient for meeting the demand of Pakistan. Shortage of electricity can be overcome by the hydroelectric power but it has disadvantages as well due to which the government is not considering it. Following are the disadvantages: High cost of producing dams, flooding of natural land and obliteration of property, pressurizing to people for moving to other areas, Possibility of ecological damage when the dams are created. (Dr Naseem Imran and Jawed Khan, 2015)

The technological losses are due to energy violation in the conductors, tools used for transmission line, supply line and magnetic losses in transformers. Minor power and energy losses are reduced by raising the load issues. These points represent the line losses: More loading of lines, Leakage of current losses, Tripping and breaking down, Heating of lines wires by the current.

THEORITICAL FRAME WORK

The "SHORTAGE OF ELECTRICITY" may be explained on the dependency of the following four independent variables:

1. Line losses
2. Infrastructure
3. Financial funding
4. Hydroelectric Resources.

Line loss is the failure of electric energy due to heating of line wires by the flow of current. There is a positive relationship between shortage of electricity and line losses as due to an increase in damage of lines there is a rise in load shedding, tripping and breakdown.

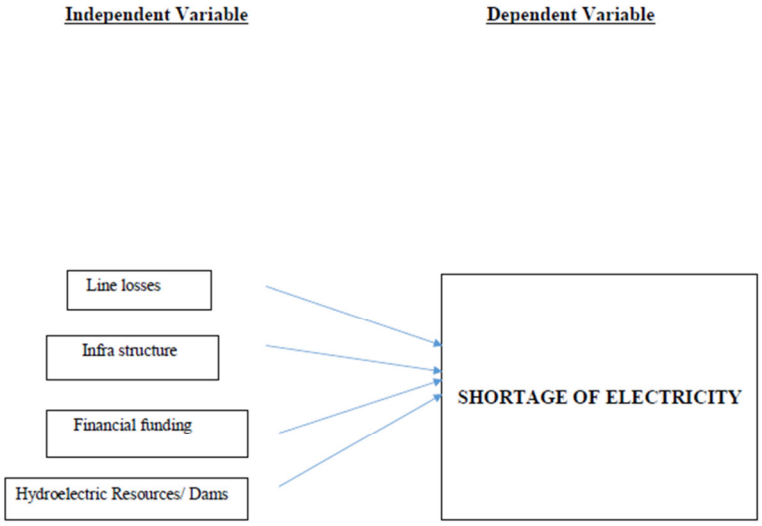
The infrastructure is the foundation and framework of the facilities provided to an organization. Old infrastructure builds up a negative relationship as insufficient change in the new policies for generating electricity which causes decline in the production of power energy leading to it is shortage.

Funding is the capital provided to start any business, usually in the form of money. It is important for the growth of any organization. **Financial funding** often refers to the projects or aids provided by other countries for the production or developing power plants. Project plays a great role in the creation of a country's economy. It has a negative relationship with the shortage of electricity. The problem can be cured if a sufficient amount is provided to the electricity generating companies.

Hydroelectric resources is the mechanical energy of flowing water which is transferred by a spinning turbine to a generator, where it is transformed to electrical energy and carried along transmission lines. Decline in the productivity of electricity from hydro electrical resources refers to the negative relationship with shortage of electricity. Increase in dams can be helpful for eliminating the problem.

In our research the four variables that we have researched are lines losses, infrastructure, financial funding and hydroelectric resources/dams. Line losses are the amount that is unpaid by the consumers (Said by Woodrow Wilson, 2015).Natural calamities are often responsible for destroying infrastructure; unfortunately Pakistan is unable to deal with these disasters. Third variable that that we are discussing is financial funding, inappropriate funding plays important roles in electricity shortage as Pakistan does not have enough amounts to start up the projects for production of electricity. The fourth variable is hydroelectric resources again Pakistan is lacking in dams we do not have enough dams to restore water said by Wilson, 2015.

SCHEMATIC DIAGRAM:-



SIGNIFICANCE

Energy, a major factor for any country, often referred as the life line. In domestic areas there is a great consumption of electricity. Pakistan produces very little power from coal while India and China produces more of its electricity from coal. From hydropower 41000 MW is being produced while we are receiving 6555 MW. (Baber Saeed Malik, 2014)

Shortage of electricity is giving a great damage to the economy as it plays a significant role. It is affecting Pakistan's agriculture sector by giving harm to the cropping and refining segment, as electricity is required to chop the crops off, secondly industry sector is being affected as dying; printing, stitching etc takes place by electricity.

Electricity is the leading element for any country. As far as Pakistan is considered most of its economy depends upon electricity as it is more agrarian country. As a whole more of our lives depend upon electricity from a nail to a machine. It requires electricity to work almost manual machines are eliminating in every sector. Pakistan needs to strive very hard to compete the other countries, even after having all the resources we are unable to boost our economy although our country is rich in every resource that are needed to produce electricity.

SCOPE

This article would be helpful for students, researchers, institutes and organizations which are working on social developments. This article gives you a brief idea about primary resources like fuel, coal, gas, hydro, wind, nuclear in our country which are used to generate electricity and show increase and decrease as well as limitations of these resources, problems related to electricity shortfall in our country and its impact on our industries, commercial, financial and our social lives. This article also contains information about increase in demand of electricity in our country, capability of generating electricity and requirements in shortfall of electricity. Government steps, new projects and schemes in resolving this shortage of electricity. This article also summarize the numeric data of power plant, transmission and distribution line and other necessary equipments like transformers ,cables PMT'S, grids, substitutions which are used in our electrical power system.

Furthermore it is also useful for the potential investors, it gives a brief detail of the sectors which are being affected by the shortfall and how situation can be improved with little efforts in the productivity of electricity.

METHODOLOGY

Quantitative research approach is adopted as the research precisely comprised of facts, figures and statistics of dependent and various independent variables. Regression and Correlation analysis is applied to check dependency of shortage of electricity on some Variables. For this purpose, questionnaire is filled by twenty-five companies (total population) and a sample size of fifty (questionnaire) is taken as a primary data whereas Newspapers and Websites are used to extract Secondary Data. Based on our Study, we are assuming that

shortage of electricity depends upon line losses, infrastructure, financial funding and hydro electric resources and therefore:
Regression model can be expressed as:
y = a + bx1 + bx2 + bx3 + bx4
X1= line losses
X2= Infrastructure
X3= hydroelectric resources
X4= financial funding
Y = a + b (line losses) +b (infrastructure) +b (hydro electric resources) +b (financial funding)
H_o: There is no relationship between line losses and shortage of electricity.
H_A: There is a relationship between line losses and shortage of electricity.
H_o: There is no relationship between infrastructure and shortage of electricity.
H_A: There is a relationship between infrastructure and shortage of electricity.
H_o: There is no relationship between financial funding power plants and shortage of electricity.
H_A: There is a significant relationship between financial funding power plants and shortage of electricity.
H: There is no relationship between hydroelectric resources /dams and shortage of electricity.
H: There is a significant relationship between hydroelectric resources / dams and shortage of electricity.

ANALYSIS & INTERPRETATION

REGRESSION

Dependent variable: Shortage of Electricity
After applying regression the result of Hydroelectric reservoir HO is rejected because the sig value less than alpha (0.018 < 0.05). The result of Line losses Ho is accepted because the sig value greater than alpha (0.644 > 0.05). The result of Financial funding Ho is accepted because the sig value is greater than alpha (0.072 > 0.05). The result of Infrastructure Ho is accepted because the sig value is greater than alpha (0.256 > 0.05).

CONCLUSION

We conducted a practical research on the efficiency of electricity the hypothesis that we have to test were the relationship between four of the variables which were line losses, infrastructure, financial funding and hydroelectric dams. To check hypothesis we conducted a research through questionnaire with some variables the result that was derived are three of hypothesis were rejected while one was accepted which was between efficiency of electricity and hydroelectric dams. We can also conclude that improper Government policies, hydroelectric resources, monopoly, increase in demand and few other factors plays an important role in the decrease in efficiency of electricity and to make an increase in the efficiency we have to enhance all these factors.

RECOMMENDATION

Following are the recommendations:-
1) Resources must be explored in order to generate electricity in lower prices.
2) Specialized skilled person must be trained to use that equipment which is needed to utilize resources.
3) Funding program must be held. Government should create energy policies which can aid in restoring energy.
4) Energy must be created using bio degradable waste as well as disposable products.
5) Dams must be created to store excess water which is the result of floods and heavy rainfall.

LIMITATION

Limitations according to the researcher were field, budgeting and parameters. Information given is often biased and does not certain appropriate information. During research people of various natures were come a crossed which was a big constraint. Illiteracy was the major faced during research as the information providers were unable to understand the subject matter. Most of the workers were reluctant to provide the information due to which valuable information cannot be acquired.

REFERENCES

Haider Shabib and Noel Alter."An Emperical Analysis on Electricity of Pakistan".International Journal of Energy Economics and Policy.Vol:1, No.4, (2011):116-139
Ali Shahzad and Nashid Unum Shah."Electricity Crisis In Pakistan: Reception &Adoption of Energy Saving Campaign Messages by PEPCO".Pakistan Journal of Social Sciences (PJSS).Vol:32, No.1, (2012):185-198
Amjad Azam Chaudhry."A Panel Data Analysis of Electricity Demand In Pakistan". The Lahore Journal of Economics.Vol:15, (2010):75-106
Dr Naseem Imran and Jawed Khan."Impact of Energy Crisis on Economic Growth of Pakistan".International Journal Of African And Asian Studies.Vol:7, (2015):09-38

Dr M Arshad, Sarfaraz Hussain, Abdul Maqsood, Dr Zeb Arshad, Dr M Awais and Majid Idres."Electrical Energy Crisis In Pakistan And Their Possible Solution".International Journal Of Basic And Applied Science IJBAS-IJENS. Vol.11: 05, (2011):36-52

Siddique .R."Energy And Economic Growth in Pakistan".The Pakistan Development Review.Vol:43, (2004):178-200

RESULTS OF REGRESSION
HYDROELECTRIC RESERVOIR

ANOVA (b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.292	5	1.458	3.108	.018(a)
	Residual	19.708	42	.469		
	Total	27.000	47			

A Predictors: (Constant), Thermal_power_generation, Dam_Reserviors, Severe_Weather, Coal, Hydrelectric_Reservoir
B Dependent Variable: Efficiency

Coefficients (a)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.739	.395		4.403	.000
	Hydrelectric_Reservoir	.345	.117	.452	2.953	.005
	Coal	.358	.121	.430	2.958	.005
	Thermal_power_generation	-.306	.133	-.353	-2.299	.027
	Dam_Reserviors	-.146	.166	-.117	-.878	.385
	Severe_Weather	-.182	.101	-.252	-1.790	.081

A Dependent Variable: Efficiency

LINE LOSSES

ANOVA (b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.011	5	.402	.676	.644(a)
	Residual	24.989	42	.595		
	Total	27.000	47			

A Predictors: (Constant), Luxuries, Illegal_connections, Decrease_in_line_losses, Distribution_system, and Theft_of_electricity
B Dependent Variable: Efficiency

Coefficients (a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.368	.342		3.998	.000
	Decrease_in_line_losses	.280	.174	.288	1.605	.116
	Distribution_system	-.146	.165	-.174	-.884	.381
	Theft_of_electricity	.054	.165	.071	.325	.747
	Illegal_connections	.074	.144	.103	.512	.611
	Luxuries	-.025	.109	-.039	-.234	.816

A Dependent Variable: Efficiency

FINANCIAL FUNDING

ANOVA (b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.573	9	.953	1.964	.072(a)
	Residual	18.427	38	.485		
	Total	27.000	47			

A Predictors: (Constant), increase_in_productivity, Circular_Debts, Renewable_energy, Government, New_plants, Rental_plants, High_cost_of_fuels, Proper_Recovery_of_Bills, Financial_funding
B Dependent Variable: Efficiency

Coefficients (a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.495	.497		.996	.326
	Financial_funding	.089	.200	.083	.447	.657
	High_cost_of_fuels	.324	.132	.379	2.456	.019
	Rental_plants	-.135	.107	-.194	-1.258	.216
	Circular_Debts	.088	.137	.110	.641	.526
	Proper_Recovery_of_Bills	.012	.225	.009	.051	.960
	Government	-.021	.159	-.019	-.132	.896
	Renewable_energy	.055	.154	.061	.359	.721
	New_plants	.391	.158	.383	2.481	.018
	increase_in_productivity	-.008	.090	-.012	-.085	.933

A Dependent Variable: Efficiency

INFRASTRUCTURE

ANOVA (b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.468	6	.745	1.355	.256(a)
	Residual	22.532	41	.550		
	Total	27.000	47			

A Predictors: (Constant), barriers_for_productivity, Infrastructure, Demand, Energy Planning, Monopoly, Over_Population
B Dependent Variable: Efficiency

Coefficients (a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.911	.436		2.088	.043
	Infrastructure	-.122	.113	-.178	-1.081	.286
	Monopoly	.074	.147	.082	.500	.620
	Energy_Planning	.507	.204	.405	2.489	.017
	Demand	.052	.147	.063	.351	.728
	Over_Population	.037	.112	.062	.328	.745
	barriers_for_productivity	-.015	.142	-.019	-.107	.915

A Dependent Variable: Efficiency